Amendments to the Claims

Claim 1 (currently amended): An interleaver comprising:

a birefringent ~~element~~ device assembly comprising at least one spatial birefringent ~~element~~ device, the birefringent ~~element~~ device assembly providing two interim output components;

a reflector configured to direct the two interim output components from the birefringent ~~element~~ device assembly back through the birefringent ~~element~~ device assembly;

wherein the spatial birefringent ~~element~~ device consists of:

a polarization beam splitter to ~~first~~ separate an optical beam into two orthogonally polarized components[[,]];

a first polarization rotator and a first reflector to control the propagation of one of the two orthogonally polarized components;

a second polarization rotator and a second reflector to control the propagation of the other one of the two orthogonally polarized components;

wherein the first polarization rotator, the first reflector, the second polarization rotator, the second reflector and the polarization beam splitter are configured such that each of the two orthogonally polarized components travels along separate paths of different optical path lengths ~~such that~~ and when the two orthogonally polarized components recombine at the output of the spatial birefringent device, a ~~birefringent effect~~ phase delay between the two orthogonally polarized components is achieved.

Claim 2 (currently amended): The interleaver as recited in claim 1, further comprising a polarization rotator configured to align the two interim output components prior to the two components being transmitted back through the birefringent ~~element~~ device assembly such that approximately zero dispersion is obtained in an output of the interleaver.

Claims 3-6 (canceled)

Claim 7 (currently amended): The interleaver as recited in claim 1, wherein the birefringent ~~element~~ device assembly comprises a plurality of spatial birefringent ~~elements~~ devices.

Claim 8 (currently amended): The interleaver as recited in claim 1, wherein the birefringent ~~element~~ device assembly comprises a first spatial birefringent ~~element~~ device having an equivalent angular orientation of φ_1, a second spatial birefringent ~~element~~ device having an equivalent angular orientation of φ_2 and a third spatial birefringent ~~element~~ device having an equivalent angular orientation of φ_3;

wherein an order of the first spatial birefringent ~~element~~ device, second spatial birefringent ~~element~~ device, and third spatial birefringent ~~element~~ device is selected from the group consisting of:

first spatial birefringent ~~element~~ device, second spatial birefringent ~~element~~ device, third spatial birefringent ~~element~~ device;

third spatial birefringent device, second spatial birefringent ~~element~~ device, first spatial birefringent ~~element~~ device; and

wherein the equivalent angular orientations are with respect to an equivalent polarization direction of light entering the spatial birefringent ~~element~~ device ~~assembly~~.

Claim 9 (currently amended): The interleaver as recited in claim 1, wherein the birefringent ~~element~~ device assembly comprises:

a first spatial birefringent ~~element~~ device having an equivalent angular orientation of 45° and having a phase delay of Γ;

a second spatial birefringent ~~element~~ device having an equivalent angular orientation of -21° and having a phase delay of 2Γ; and

a third spatial birefringent ~~element~~ device having an equivalent angular orientation of 7° and having a phase delay of 2Γ.

Claim 10 (currently amended): The interleaver as recited in claim 1, wherein the birefringent ~~element~~ device assembly comprises two spatial birefringent ~~elements~~ devices.

Claim 11 (currently amended): The interleaver as recited in claim 1, wherein the birefringent ~~element~~ device assembly comprises:

a first spatial birefringent ~~element~~ device having an equivalent angular orientation of 45° and having a phase delay of Γ; and

a second spatial birefringent ~~element~~ device having an equivalent angular orientation of -21° and having a phase delay of 2Γ.

Claim 12 (currently amended): The interleaver as recited in claim 1, wherein the birefringent ~~element~~ device assembly and the reflector are configured so as to facilitate interleaving of a plurality of input light beams simultaneously.

Claim 13 (currently amended): The interleaver as recited in claim 1, wherein ~~each spatial birefringent element defines two light paths~~ two separate light paths are defined for the two orthogonally polarized components, respectively, within the spatial birefringent device, each light path having a different optical path length and wherein a difference in optical path length between the two paths is provided by a material having an index of refraction greater than ~~one~~ unity ~~which~~ that is disposed within at least a portion of one of the first and second paths.

Claim 14 (currently amended): The interleaver as recited in claim 1, wherein ~~each spatial birefringent element defines two light paths~~ two separate light paths are defined for the two orthogonally polarized components, respectively, within the spatial birefringent device and wherein an index of refraction is different for at least a portion of at least one of the two light paths so as to cause the two light paths to have different optical path lengths.

Claim 15 (previously presented): The interleaver as recited in claim 1, wherein the interleaver channels have spacing which is tunable.

Claim 16 (currently amended): A birefringent ~~element~~ device assembly comprising:

at least one spatial birefringent ~~element~~ device; and

a polarization rotator for controlling an equivalent angle of the birefringent ~~element~~ device ~~assembly~~;

wherein the spatial birefringent ~~element~~ device consists of:

a polarization beam splitter to ~~first~~ separate an optical beam into two orthogonally polarized components[[,]];

a first polarization rotator and a first reflector to control the propagation of one of the two orthogonally polarized components;

a second polarization rotator and a second reflector to control the propagation of the other one of the two orthogonally polarized components;

wherein the first polarization rotator, the first reflector, the second polarization rotator, the second reflector, and the polarization beam splitter are configured such that each of the two orthogonally polarized components travels along separate paths of different optical path lengths ~~such that~~ and when the two orthogonally polarized components recombine at the output of the spatial birefringent ~~element~~ device, a ~~birefringent effect~~ phase delay between the two orthogonally polarized components is achieved.

Claim 17 (previously canceled)

Claim 18 (currently amended): A method for interleaving, the method comprising:

transmitting light through a birefringent ~~element~~ device assembly comprised of at least one spatial birefringent ~~element~~ device, the birefringent ~~element~~ device assembly separating the light into first and second interim output components;

making the two interim output components polarized along desired polarization directions; and

transmitting the first and second interim output components back through the birefringent ~~element~~ device assembly;

wherein the spatial birefringent ~~element~~ device consists of:

a polarization beam splitter to ~~first~~ separate an optical beam into two orthogonally polarized components[[,]];

a first polarization rotator and a first reflector to control the propagation of one of the two orthogonally polarized components;

a second polarization rotator and a second reflector to control the propagation of the other one of the two orthogonally polarized components;

wherein the first polarization rotator, the first reflector, the second polarization rotator, the second reflector, and the polarization beam splitter are configured such that each of the two orthogonally polarized components travels along separate paths of different optical path lengths ~~such that~~ and when the two orthogonally polarized components recombine at the output of the spatial birefringent ~~element~~ device, a ~~birefringent effect~~ phase delay between the two orthogonally polarized components is achieved.

Claim 19 (canceled)

Claim 20 (currently amended): An interleaver comprising:

a birefringent ~~element~~ device assembly comprising at least one spatial birefringent ~~element~~ device;

a reflector configured to direct an interim output of the birefringent ~~element~~ device assembly back through the birefringent ~~element~~ device assembly;

wherein the spatial birefringent ~~element~~ device consists of:

a polarization beam splitter to ~~first~~ separate an optical beam into two orthogonally polarized components[[,]];

a first polarization rotator and a first reflector to control the propagation of one of the two orthogonally polarized components;

a second polarization rotator and a second reflector to control the propagation of the other one of the two orthogonally polarized components;

wherein the first polarization rotator, the first reflector, the second polarization rotator, the second reflector and the polarization beam splitter are configured such that each of the two orthogonally polarized components travels along separate paths of different optical path lengths ~~such that~~ and when the two orthogonally polarized components recombine at the output of the spatial birefringent ~~element~~ device, a ~~birefringent effect~~ phase delay between the two orthogonally polarized components is achieved[[.]]; and

wherein phase delays and ~~birefringent element~~ orientations ~~for~~ of the spatial birefringent devices in the birefringent ~~element~~ device assembly are selected from the table:

Table I

First Stage Phase Delays	First Stage Orientations	Second Stage Phase Delays	Second Stage Orientations
$\Gamma + 2m_1\pi$, $2\Gamma + 2m_2\pi$, $2\Gamma + 2m_3\pi$	$\varphi_1, \varphi_2, \varphi_3$	$2\Gamma' + 2k_3\pi$, $2\Gamma' + 2k_2\pi$, $\Gamma' + 2k_1\pi$	$90°\pm\varphi_3, 90°\pm\varphi_2, 90°\pm\varphi_1$ (parallel component) $\pm\varphi_3, \pm\varphi_2, \pm\varphi_1$ (orthogonal component) where $\Gamma - \Gamma' = 2l\pi$
$\Gamma + 2m_1\pi$, $2\Gamma + 2m_2\pi$, $2\Gamma + 2m_3\pi$	$\varphi_1, \varphi_2, \varphi_3$	$2\Gamma' + 2k_3\pi$, $2\Gamma' + 2k_2\pi$, $\Gamma' + 2k_1\pi$	$90°\pm\varphi_3, 90°\pm\varphi_2, 90°\pm\varphi_1$ (parallel component) $\pm\varphi_3, \pm\varphi_2, \pm\varphi_1$ (orthogonal component) where $\Gamma - \Gamma' = (2l + 1)\pi$
$2\Gamma + 2m_3\pi$, $2\Gamma + 2m_2\pi$, $\Gamma + 2m_1\pi$	$\varphi_3, \varphi_2, \varphi_1$	$\Gamma' + 2k_1\pi$, $2\Gamma' + 2k_2\pi$, $2\Gamma' + 2k_3\pi$	$90°\pm\varphi_1, 90°\pm\varphi_2, 90°\pm\varphi_3$ (parallel component) $\pm\varphi_1, \pm\varphi_2, \pm\varphi_3$ (orthogonal component) where $\Gamma - \Gamma' = 2l\pi$
$2\Gamma + 2m_3\pi$, $2\Gamma + 2m_2\pi$, $\Gamma + 2m_1\pi$	$\varphi_3, \varphi_2, \varphi_1$	$\Gamma' + 2k_1\pi$, $2\Gamma' + 2k_2\pi$, $2\Gamma' + 2k_3\pi$	$\pm\varphi_1, \pm\varphi_2, \pm\varphi_3$ (parallel component) $90°\pm\varphi_1, 90°\pm\varphi_2, 90°\pm\varphi_3$ (orthogonal component) where $\Gamma - \Gamma' = (2l + 1)\pi$

Wherein m_1, m_2, m_3, k_1, k_2, k_3 and l are integers (0, ±1, ±2, . . .).

Claim 21 (currently amended): An interleaver comprising:

at least one birefringent ~~element~~ device assembly, each birefringent ~~element~~ device assembly comprising at least one spatial birefringent ~~element~~ device; and

a reflector configured to direct light, which has passed through each of the birefringent ~~element~~ device assemblies sequentially, back through each of the birefringent ~~element~~ device assemblies sequentially in a reverse direction;

wherein the spatial birefringent ~~element~~ device consists of:

a polarization beam splitter to ~~first~~ separate an optical beam into two orthogonally polarized components[[,]];

a first polarization rotator and a first reflector to control the propagation of one of the two orthogonally polarized components;

a second polarization rotator and a second reflector to control the propagation of the other one of the two orthogonally polarized components;

wherein the first polarization rotator, the first reflector, the second polarization rotator, ~~and~~ the second reflector, and the polarization beam splitter are configured such that each of the two orthogonally polarized components travels along separate paths of different optical path lengths ~~such that~~ and when the two orthogonally polarized components recombine at the output of the spatial birefringent ~~element~~ device, a ~~birefringent effect~~ phase delay between the two orthogonally polarized components is achieved.